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(71) Applicants **Matburn (Holdings) Limited, Three Colts Lane, Bethnal Green, London E2 6LA**
(72) Inventors **Steven Carpenter David Craig Bishop**
(74) Agents **Elkington and Fife, High Holborn House, 52/54 High Holborn, London. WC1V 6SH**

(54) **Multiple puncture apparatus**

(57) A surgical multiple puncture device for administering to a patient chemicals or biological material for therapeutic or diagnostic purposes. A barrier 9 of flexible plastics material is arranged between an operating plunger 6 and a needle plate 8. The barrier 9 is of frusto-conical dish shape with an outwardly directed flange 3 at its periphery. A semi-tubular portion 4, or a plurality of portions, is/are provided in the flange 3 to vent air between the interior of the barrier and the outside. The barrier may be located in complementary recesses in a pack of rigid or semi-rigid plastics material with needle plates arranged in the interiors of the barriers.

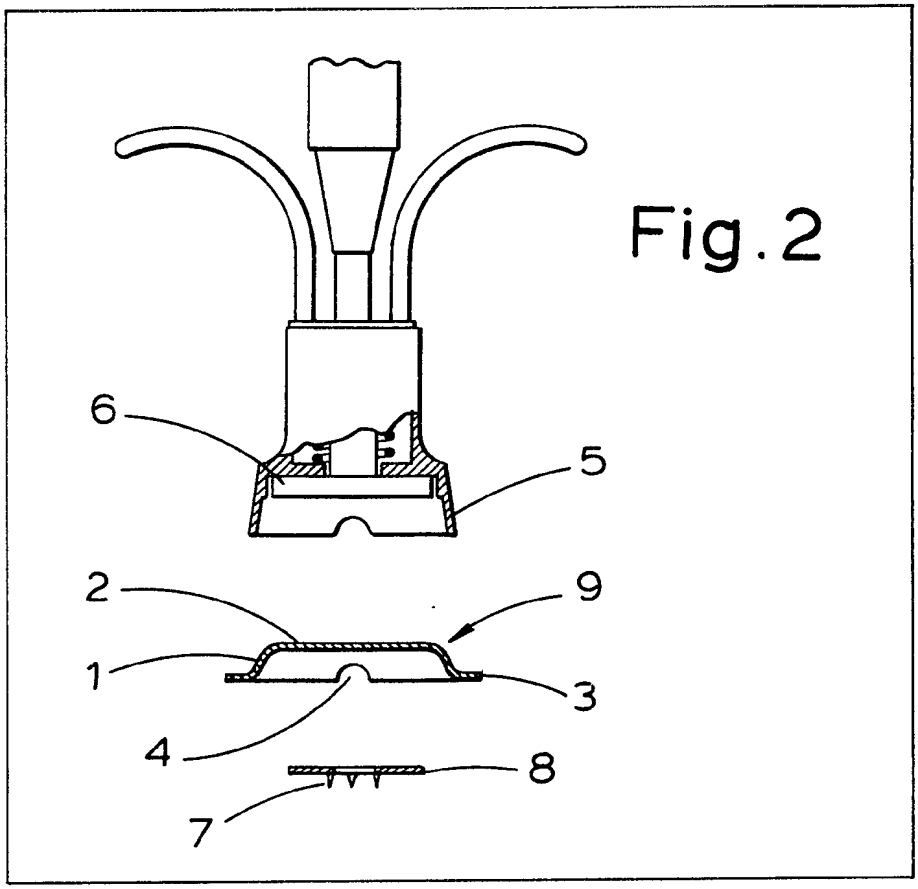

Fig.2

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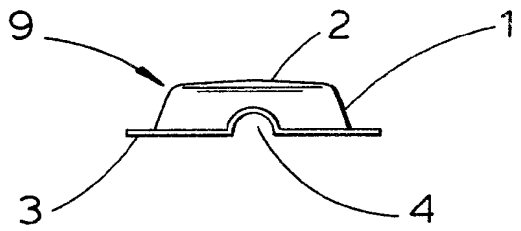

Fig. 1

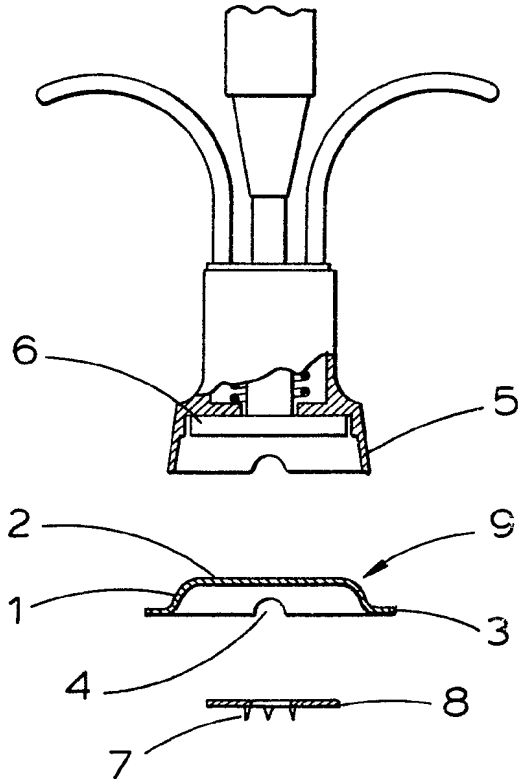

Fig. 2

SPECIFICATION

Multiple puncture apparatus

This invention relates to surgical multiple puncture devices, that is to say devices which can be used to puncture the skin of a patient in a number of places in a single operation. These devices are used for the administration of chemicals or biological material for therapeutic or diagnostic purposes. One such apparatus is described in the specification of United Kingdom Patent Number 1080986. The device described in that Patent Specification comprises a barrel which contains a displaceable plunger. Means are provided for displacing the plunger. The plunger has a magnetic member and a needle plate is retained by this magnetic member by means of magnetic attraction. However, the needle plate is removable from the plunger as desired. A perforated skin plate is attached to the needle plate. The needle plate is movable with respect to the skin plate so that the needle points on the needle plate can project through holes in the skin plate when the plunger is depressed.

An object of the present invention is to provide a way of ensuring that infection is not transmitted from one patient to another during use of such an apparatus without it being necessary repeatedly to sterilise the apparatus.

The present invention provides a multiple puncture apparatus generally of this character except that it does not have a skin plate and that the needle plate is not necessarily retained by the plunger by means of magnetic attraction.

In a multiple puncture apparatus according to the invention a flexible barrier is provided between the needle plate and the plunger. This flexible barrier is preferably of flexible plastics material. The flexible barrier may be of frusto-conical dish shape with an outwardly directed flange at its periphery. A needle plate is located inside the interior of the dish shaped barrier. Means for venting air are provided between the interior of the dish shaped barrier and the outside.

The flexible barrier is, in a preferred embodiment retained in position by magnetic attraction between the needle plate and the plunger, the base of the barrier being positioned between the needle plate and the plunger.

Such plunger apparatus is generally used for large scale therapeutic or diagnostic operations. It is, therefore, preferred to supply the barrier and needle plates in packs containing a number of them. These packs may be of rigid or semi-rigid plastics material and have recesses in which the needle plate and the barriers are assembled, each assembly consisting of one needle plate and one barrier. In that event, the air venting means of the barrier may be opposed semi-tubular portions in the flanges and these semi-tubular portions may be located in co-operating profiles in the package containing the assemblies.

A preferred embodiment of the invention is illustrated in the accompanying schematic drawings in which;

Figure 1 is an elevation which illustrates a flexible barrier means for a multiple puncture apparatus illustrated in Figure 2 which is an exploded sectional view.

As will be seen the barrier (indicated generally by numeral 9) is of approximately frusto-conical dish shape with walls 1 diverging from the "base" 2 of the dish. An outwardly directed flange 3 surrounds the mouth of the dish. The flange 3 is formed with a pair of diametrically opposed, semi-tubular portions 4 which provide a means for venting air from the interior of the dish. If desired, there need be only one portion 4 or more than two. When a needle plate 8 (Figure 2) is supplied with the flexible barrier in a supply package, these semi-tubular portions 4 can be located in suitably arranged profiles in the package thereby to locate the barrier. The purpose of the sloping walls of the barrier is to assist in the collapse of the barrier when pressure is applied during the punching operation as is described in the specification of the aforementioned specification number 1080986. The purpose of the air vents is to permit air to escape during the collapse of the barrier.

As is illustrated in Figure 2, this barrier may be used in a multiple puncture device constructed as described in the specification of Patent No. 1080986 except that it does not include a skin plate. Such an apparatus comprises a flared locating ring 5 forming part of the puncture apparatus. A magnetic plunger plate 6 is operable to force the points of needles 7 of a needle plate 8 against the skin of a patient. The needles 7 may be tines integral with the needle plate. A flexible barrier 9 of the form described with reference to Figure 1 is arranged between the needle point 8 and the magnetic plate 6. The needle plate is retained in position by the magnetic attraction of the magnetic plate 6 and this, of course, holds the barrier 9 in position. The outwardly directed flange of the barrier 9 projects beyond the periphery of the locating ring 5.

The arrangement illustrated can, as previously stated, be supplied in packs containing a number of assemblies of needle plates 8 and barriers 9 which are disposable after each operation. Thus, each assembly is used only with one patient. Such a pack can comprise a number of sockets or recesses in which the assemblies of barriers and needle plates are mounted. In use, the package can be opened to expose the various assemblies of needle plates and barriers and a puncture apparatus is registered in turn with each of the assemblies. The assembly is secured to the puncture apparatus either by magnetic action or by mechanical means after which the plunger apparatus and the assembly are withdrawn. This arrangement provides a simple and quick way of securing such assemblies to a puncture apparatus.

CLAIMS

1. A barrier for use in a surgical multiple puncture device, the said barrier being made of a flexible material and of frusto-conical dish shape with an outwardly directed flange at its periphery, means being provided for venting air between the interior of the barrier and the outside.

2. A barrier as claimed in claim 1, wherein the air venting means is a semi-tubular portion in the out-

wardly directed flange.

3. A barrier as claimed in claim 2, arranged in a pack of rigid or semi-rigid material, the barrier being located in a complementary recess in the pack, a needle plate being disposed in the interior of the dish-shaped barrier.

4. A barrier as claimed in claim 3, wherein the semi-tubular portion of the flange is located in a complementary profile in the pack.

5. A surgical multiple puncture device comprising a needle plate, a plunger and means for displacing the plunger to urge needles of the needle plate into a patient, wherein a barrier of flexible plastics material is provided between the plunger and the needle plate, the said barrier being frusto-conical dish shaped with an outwardly directed flange at its periphery and with means for venting air between the interior of the barrier and the outside.

6. A surgical multiple puncture device substantially as described with reference to the accompanying drawings.

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